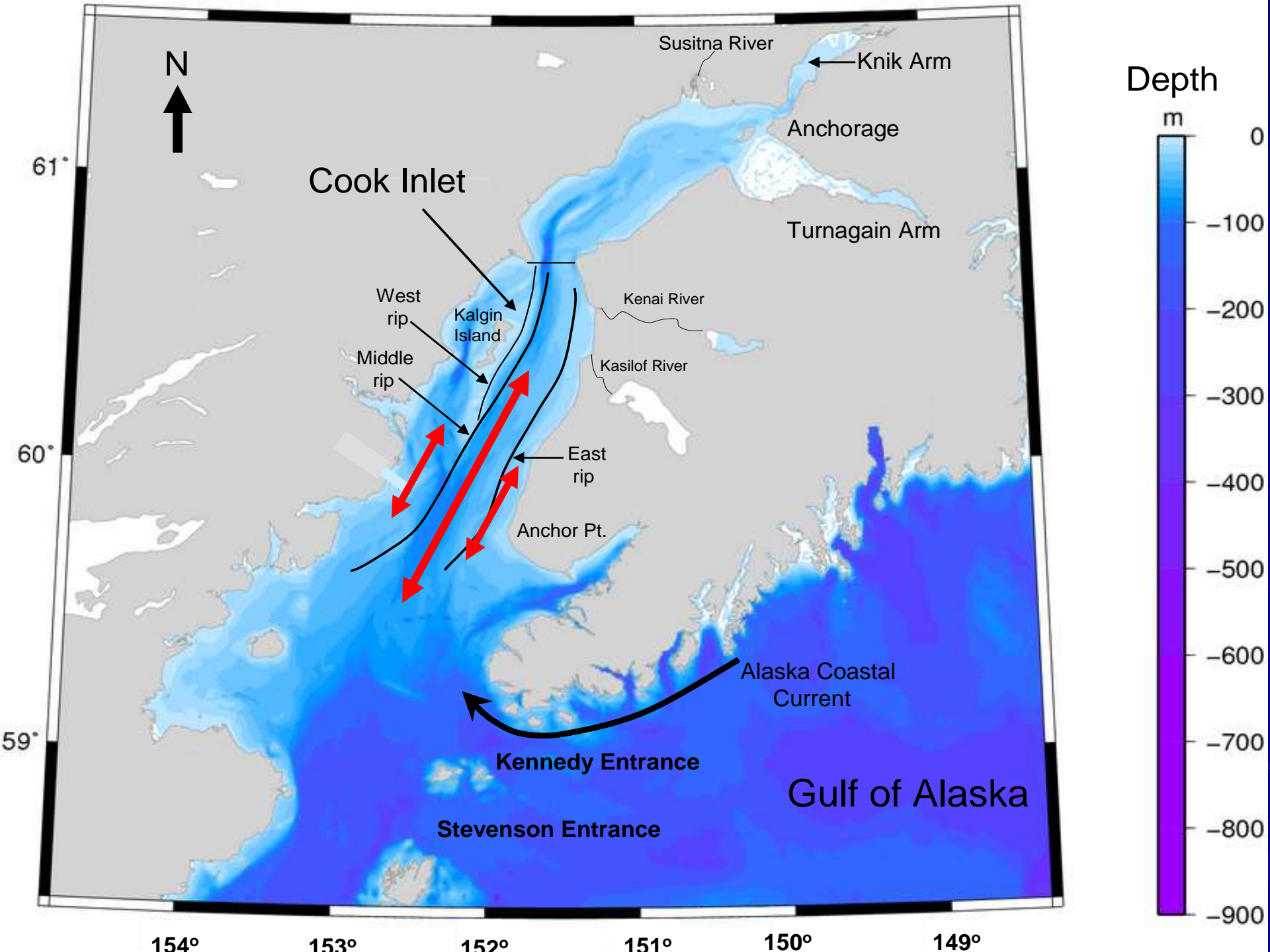


Cook Inlet Physical Habitat and Beluga Prey Abundance and Distribution



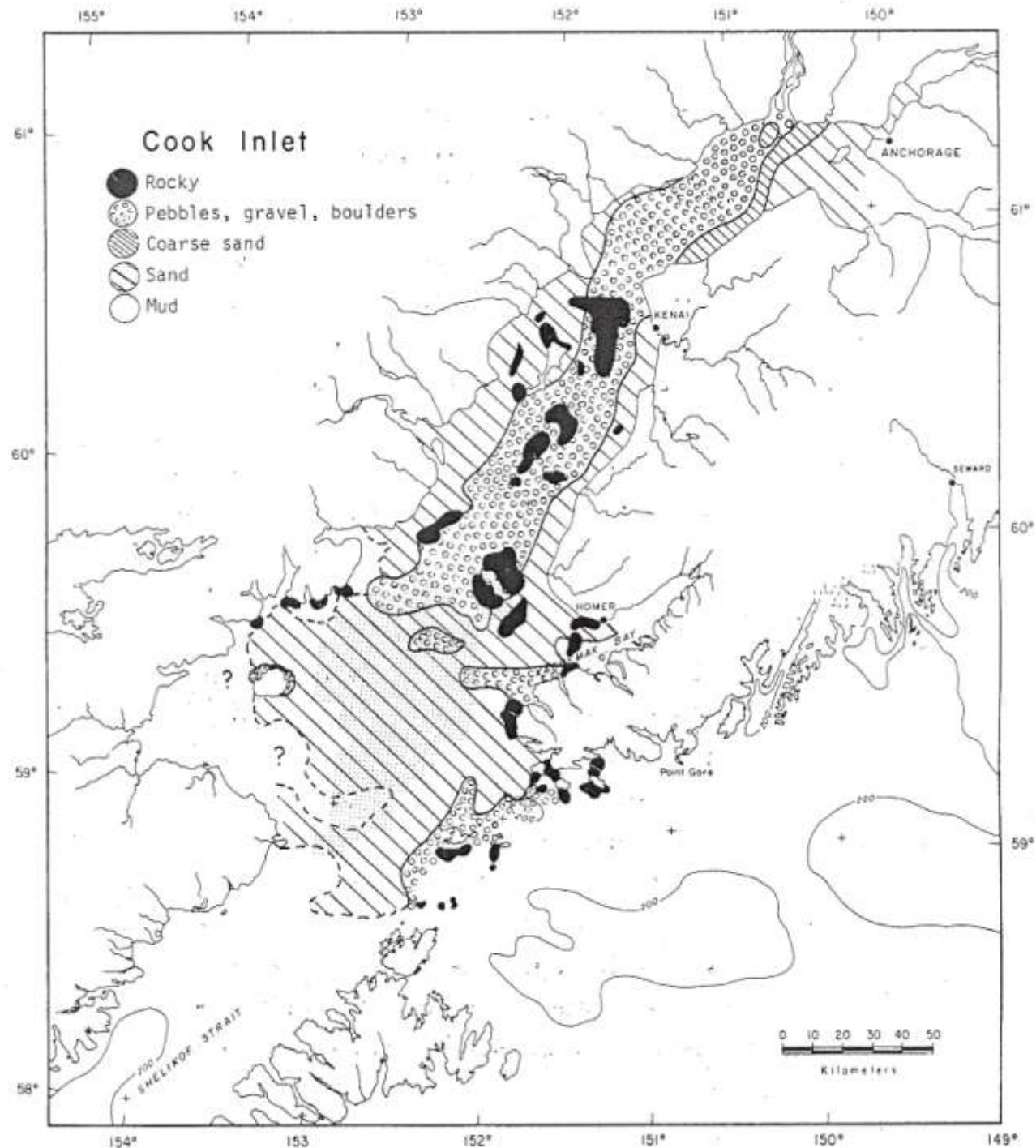
T.M Willette, Department of Fish and Game, Soldotna, Alaska



Cook Inlet Bottom Sediment Distribution

Course sediments
generally found in
areas with highest
current speeds

Fish and invertebrate
species assemblages
affected by bottom
sediment distribution

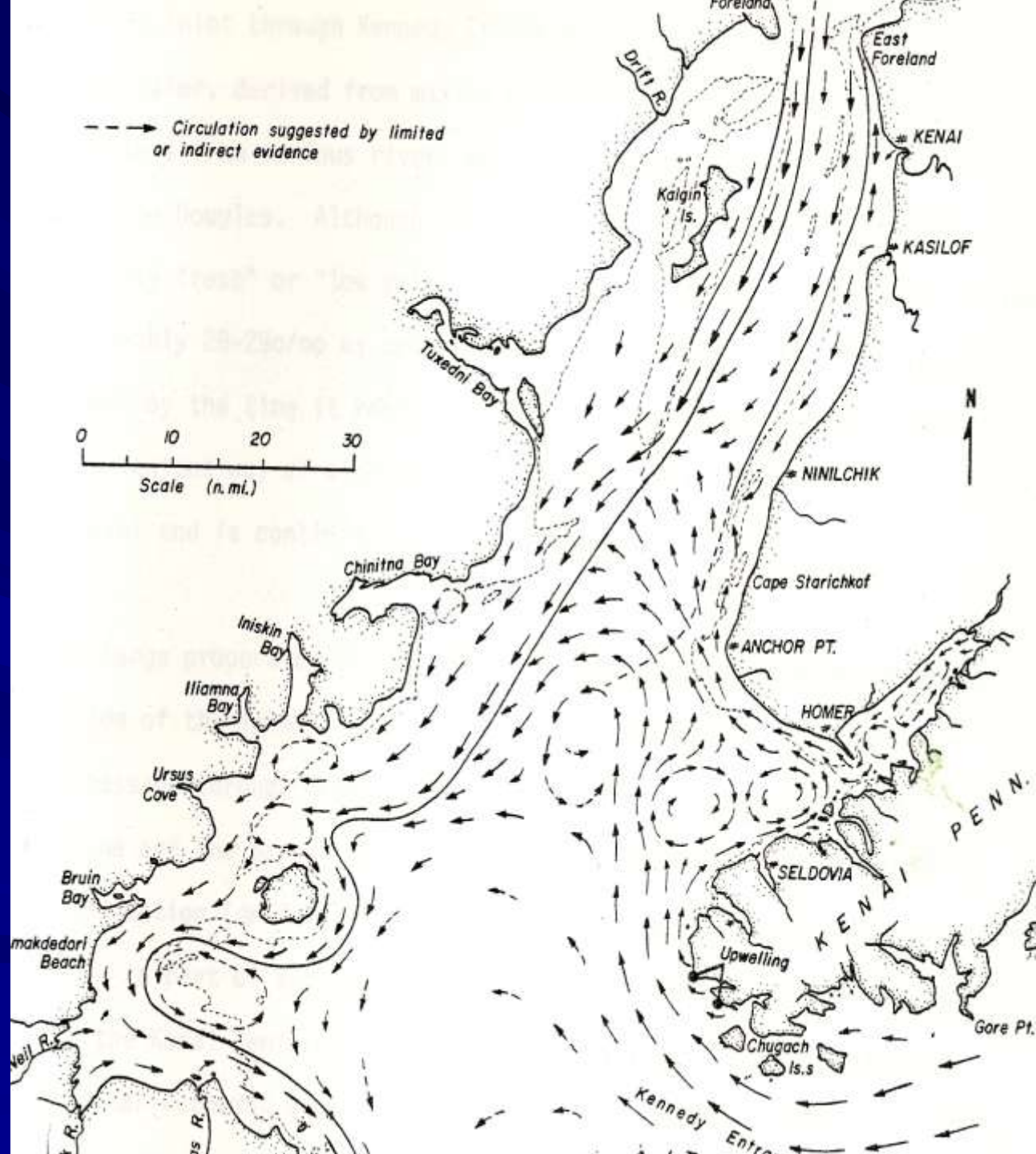


Cook Inlet Mean Circulation

Freshwater surface
layer flows out of
the inlet along
the west side

Surface convergence
along rip zones causes
downwelling

Gyres west of
Kachemak Bay cause
nutrient upwelling and
increased biological
production

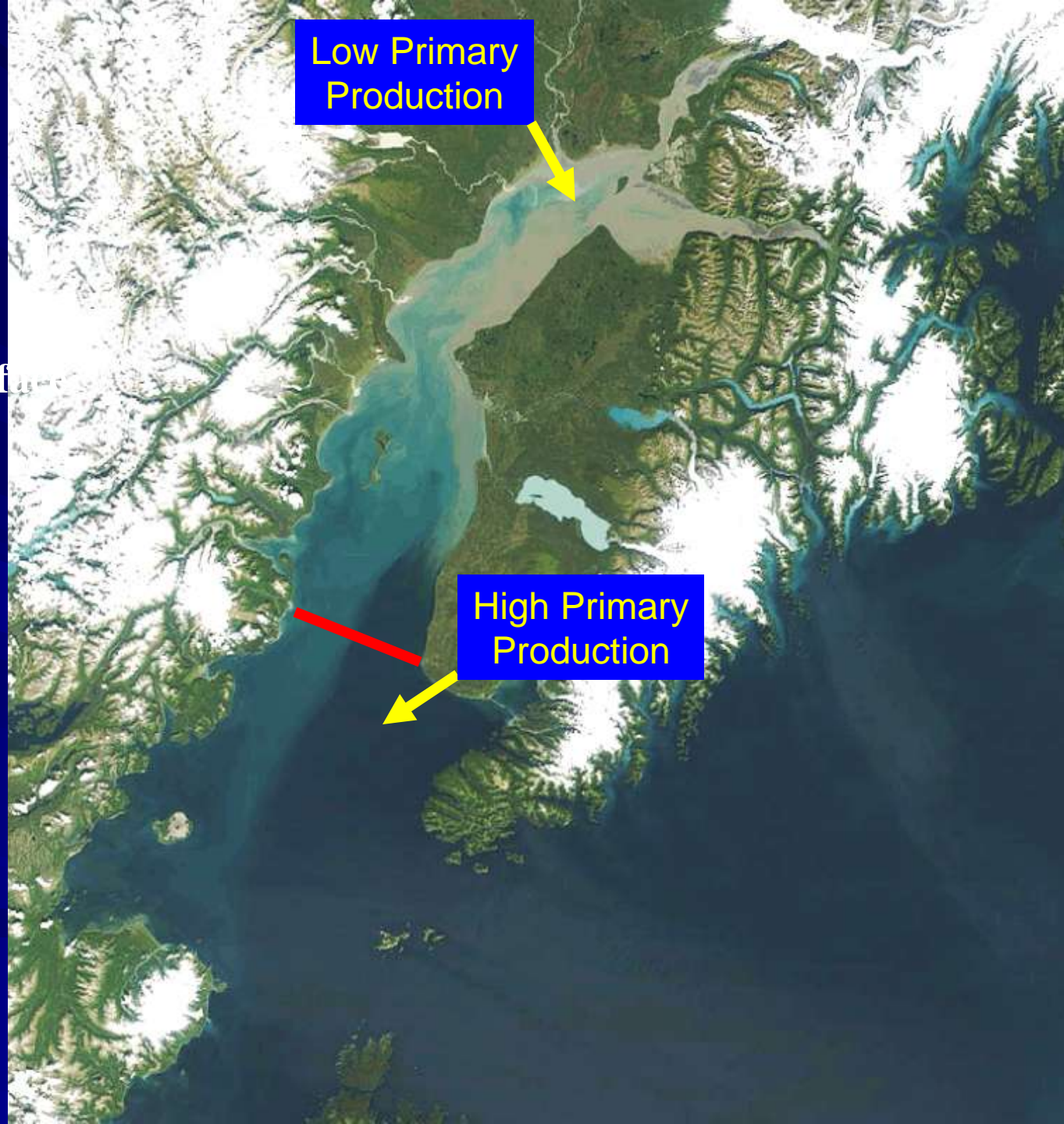


Cook Inlet Sediment Transport

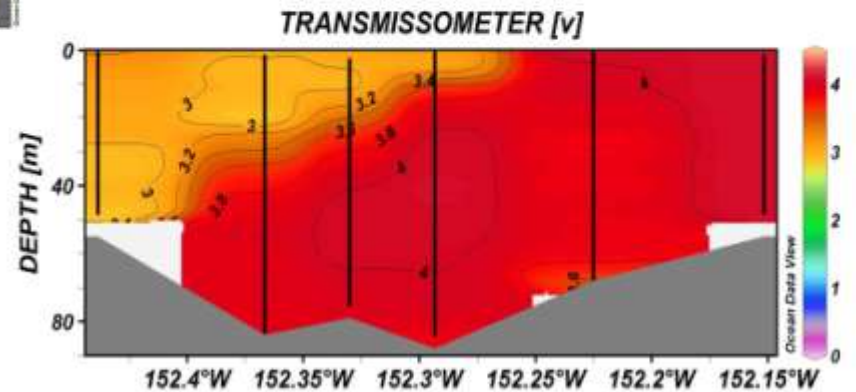
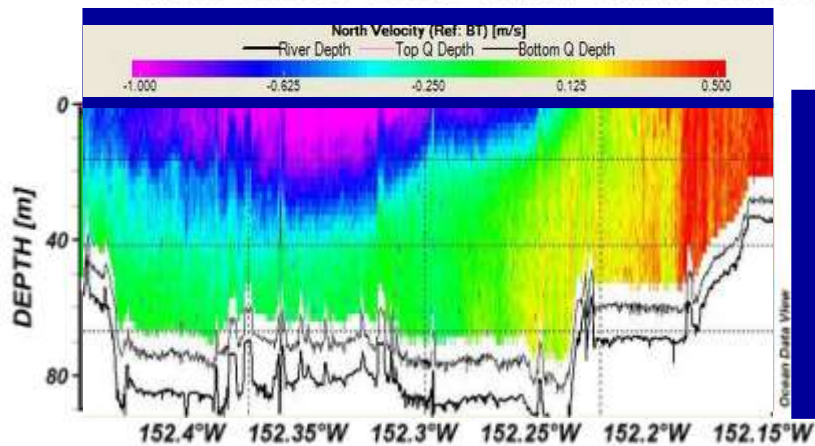
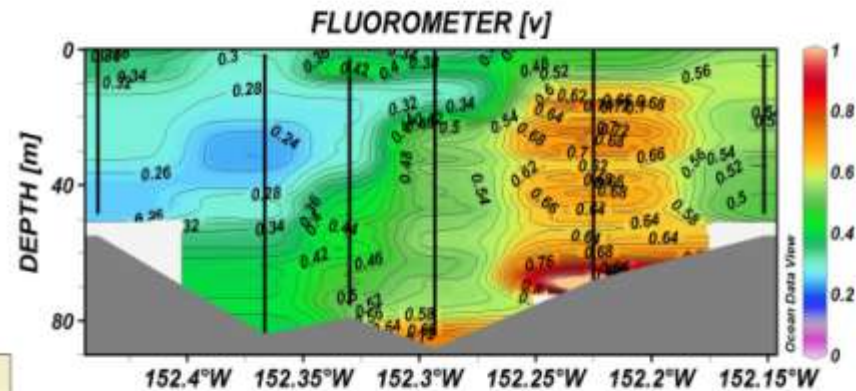
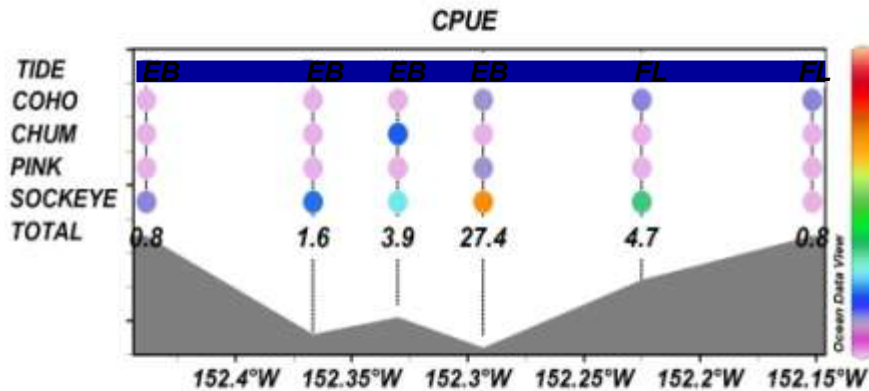
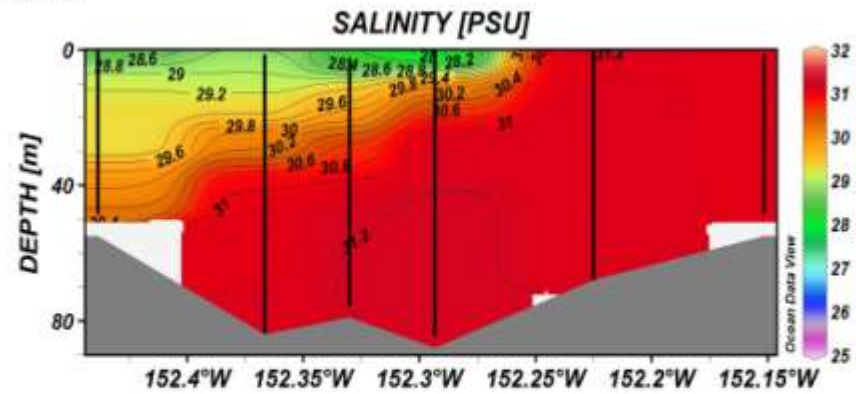
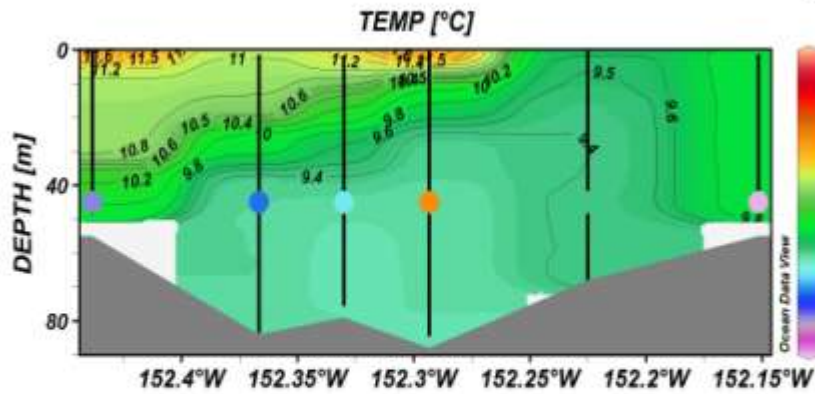
Turbid freshwater surface layer flows along the west side

Very high turbidity in shallow areas of the northern inlet

Influx of clear, high salinity water west of Kachemak Bay



July 01, 2005



Eulachon Life History

Mean Age – 3-4 years

Mean Length – 198 mm

Mean Body Weight – 60-70 g

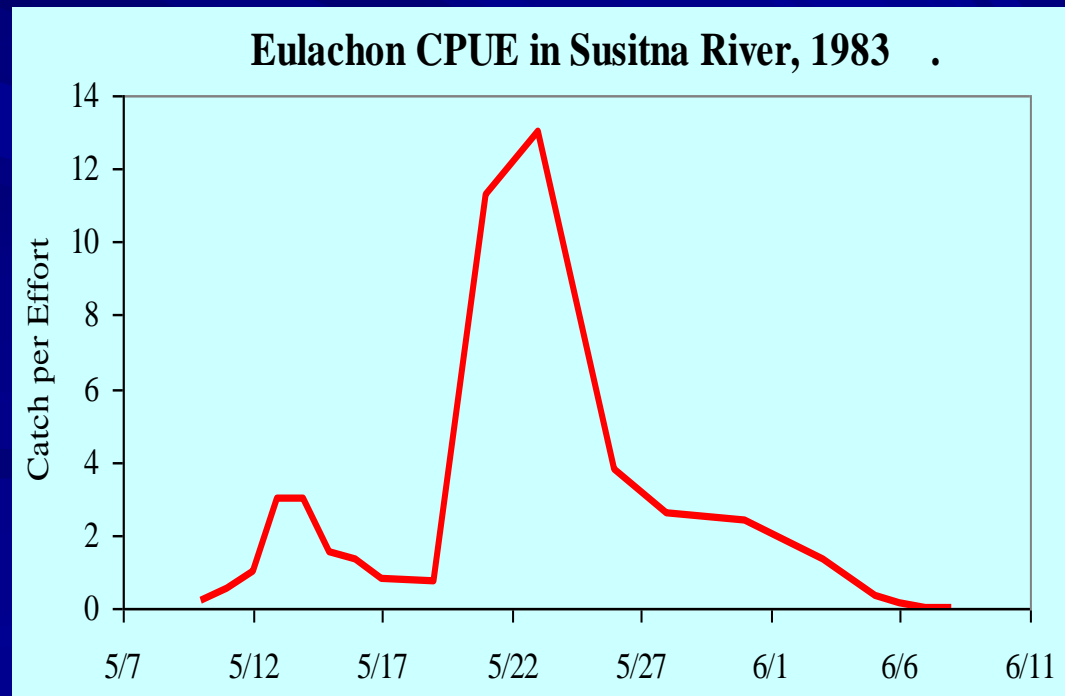
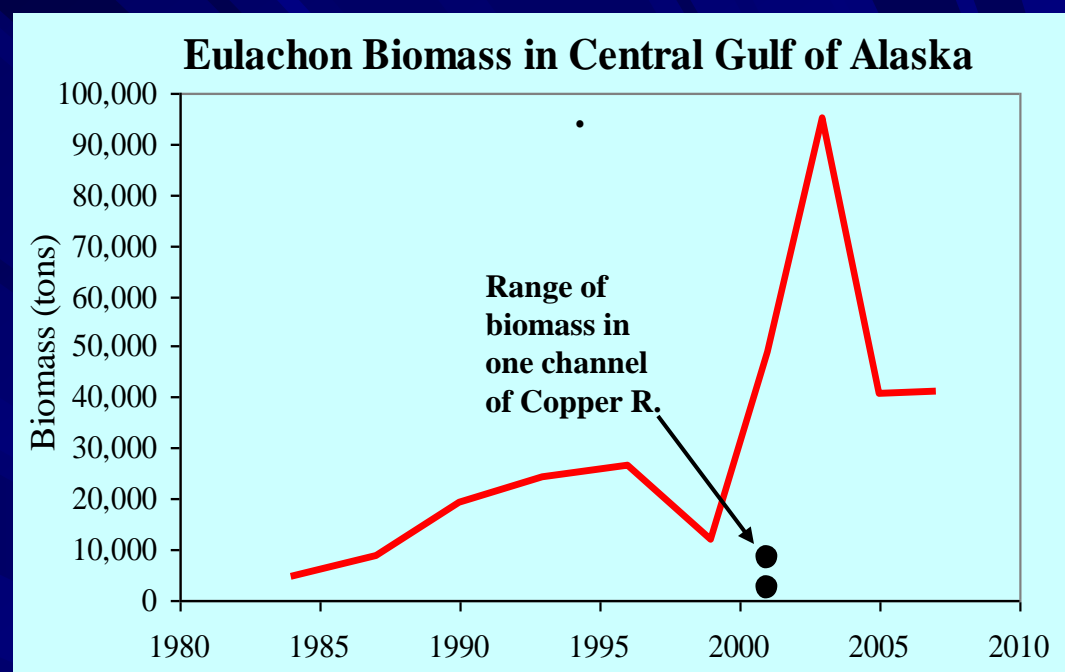
Energy Density – 2.5 kcal/g

Run timing follows ice out at river temperatures between 6-9°C.

Most spawning in Susitna River occurs below the Yentna confluence.

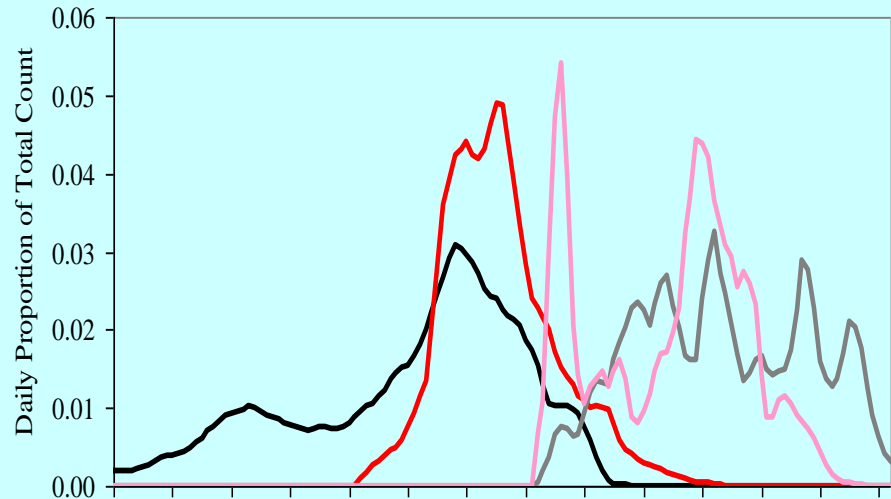
Susitna River Eulachon Harvests

Year	Pounds	Tons
1978	300	0.2
1980	4,000	2.0
1998	18,610	9.3
1999	100,000	50.0
2006	90,783	45.4
2007	125,044	62.5
2008	127,365	63.7
2009	78,258	39.1

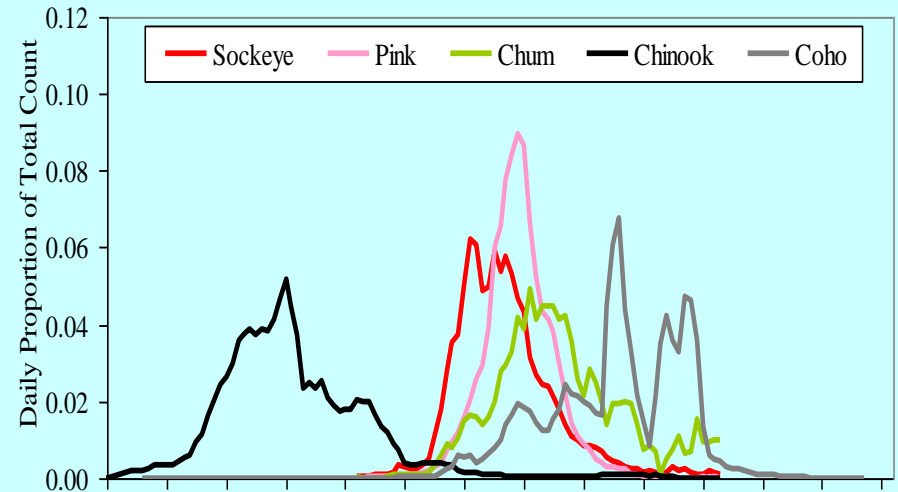


Salmon Run Timing in Cook Inlet

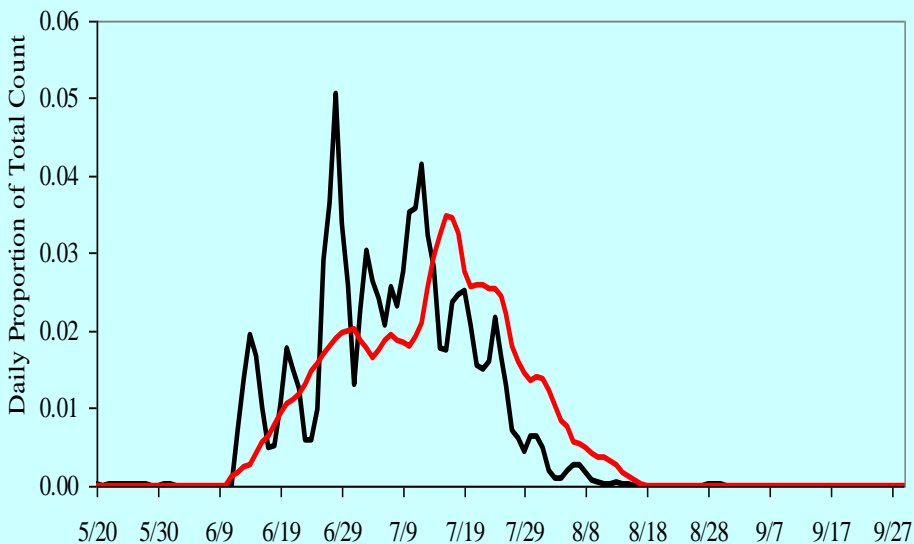
Kenai River



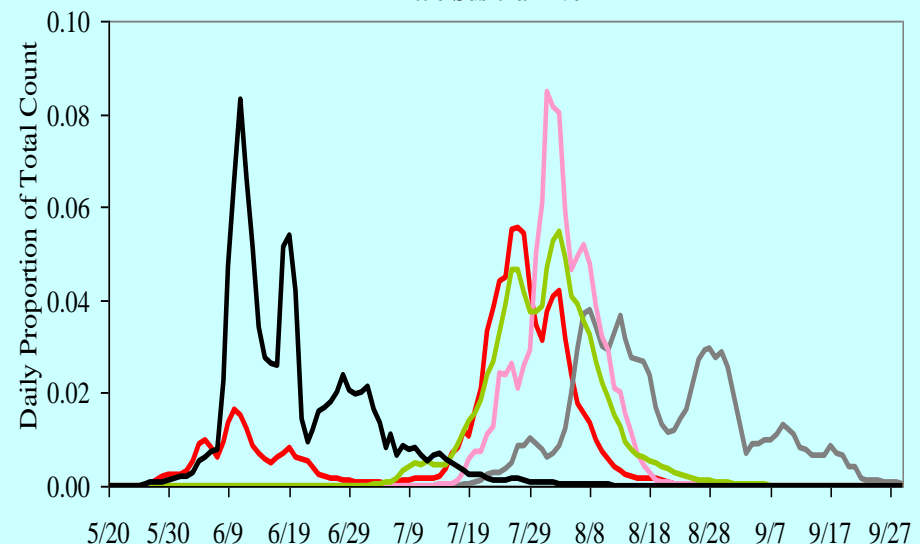
Susitna River



Kasilof River



Little Susitna River

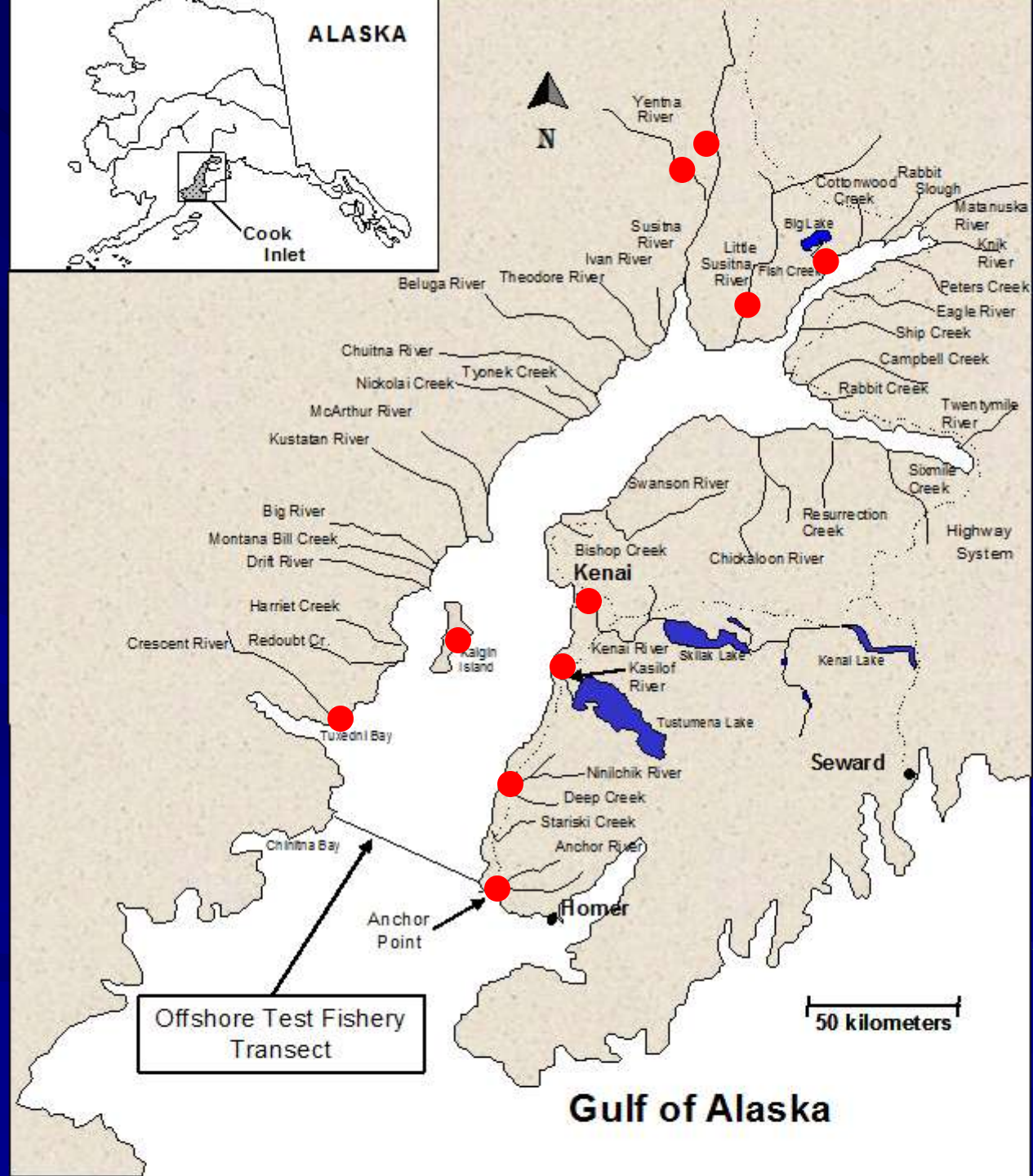


Cook Inlet Salmon Streams

Red dots indicate locations in Cook Inlet where salmon escapements are estimated using either sonar or weirs.

Salmon escapement estimates are available for numerous other smaller streams in Cook Inlet.

Offshore Test Fishery provides inseason abundance estimates for salmon runs entering upper Cook Inlet.



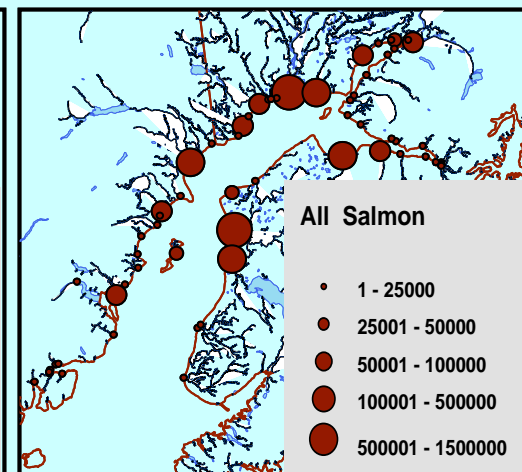
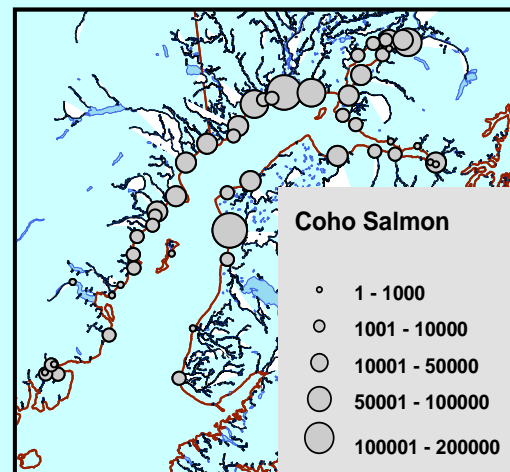
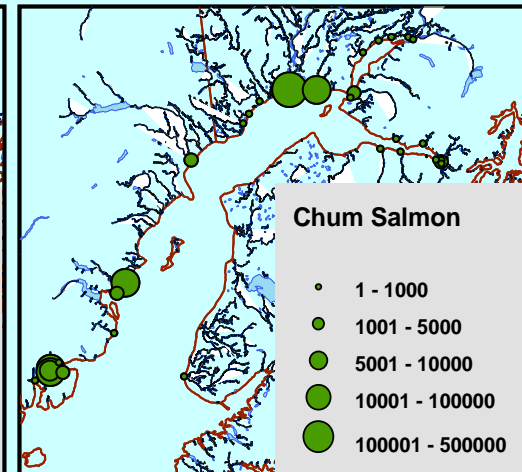
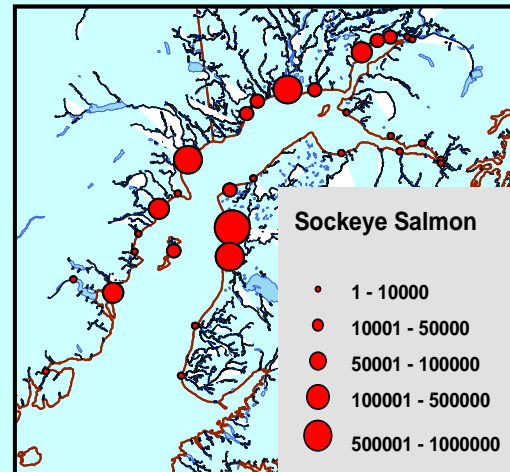
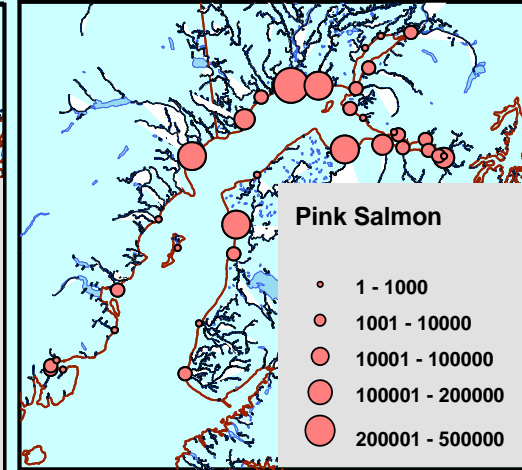
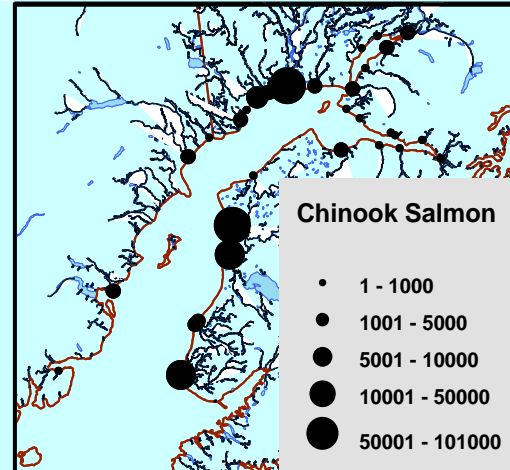
Salmon Relative Abundance and Distribution

West side rivers support small Chinook and moderate coho salmon runs

Susitna River supports relatively large runs of all five salmon species

Little Susitna River supports moderately sized runs of pink, chum, and coho salmon

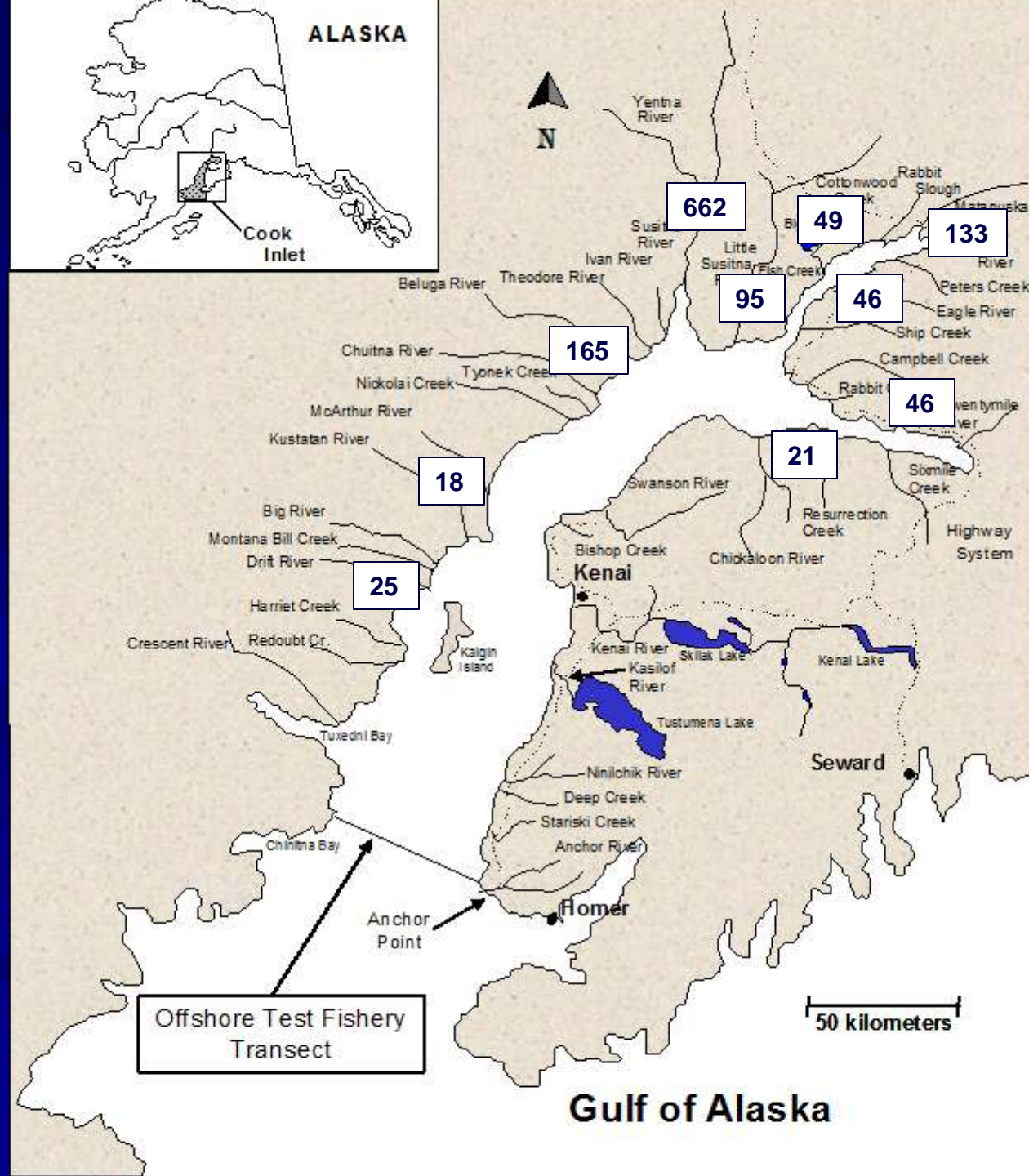
Knik and Turnagin Arm rivers support relatively small runs of all five salmon species



Coho Salmon Distribution in 2002

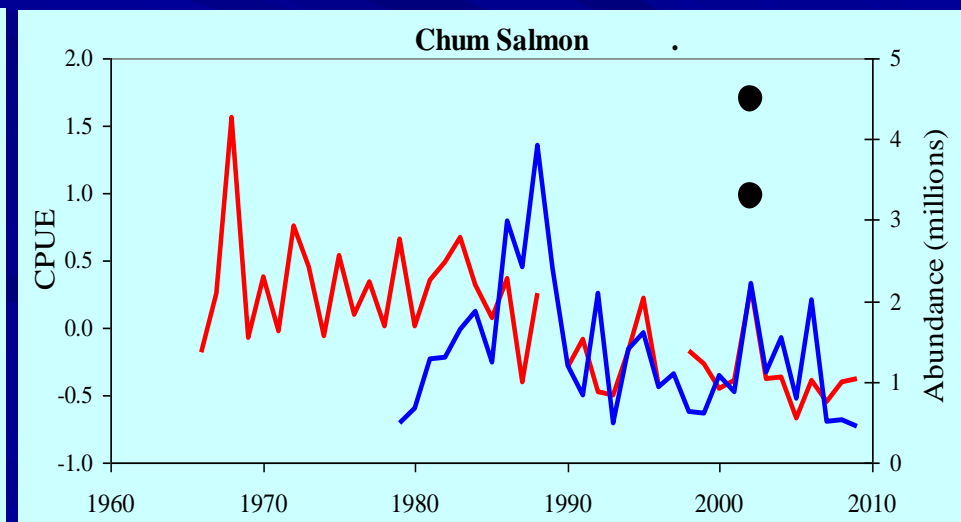
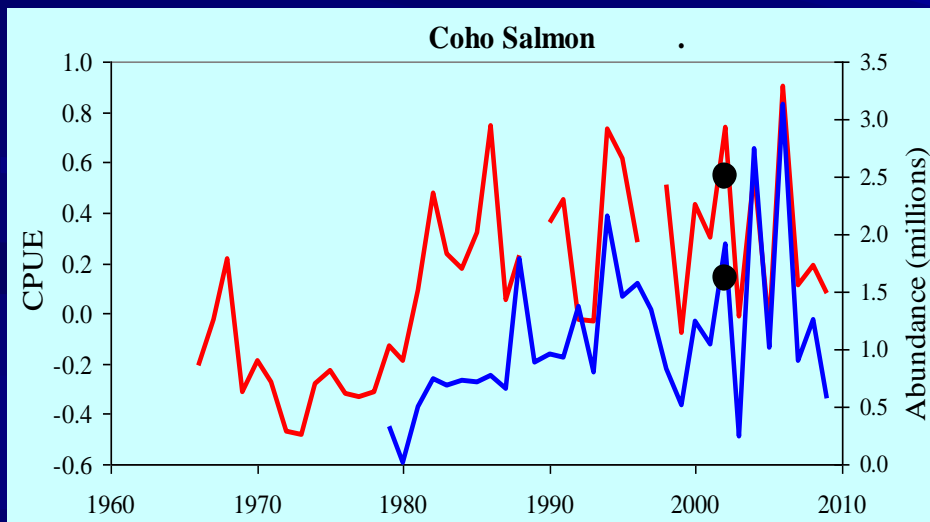
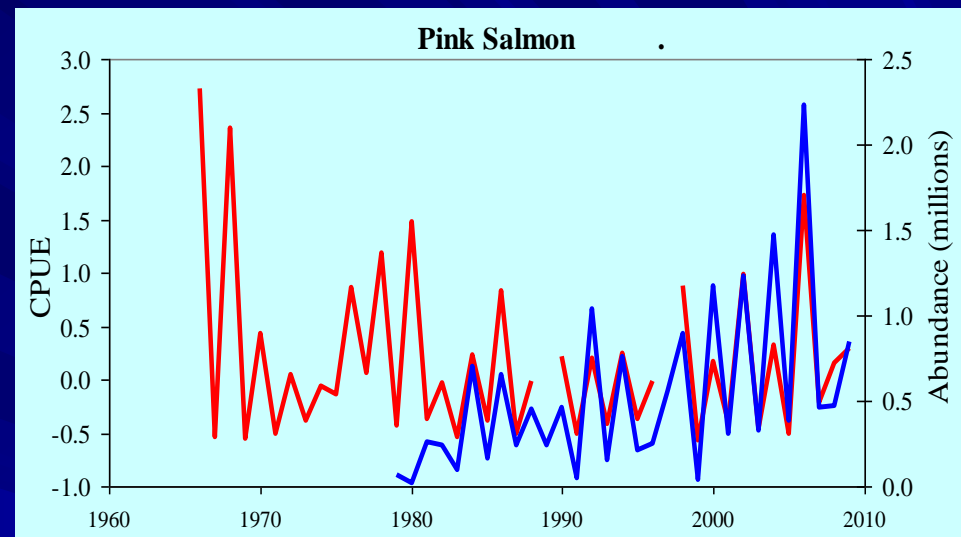
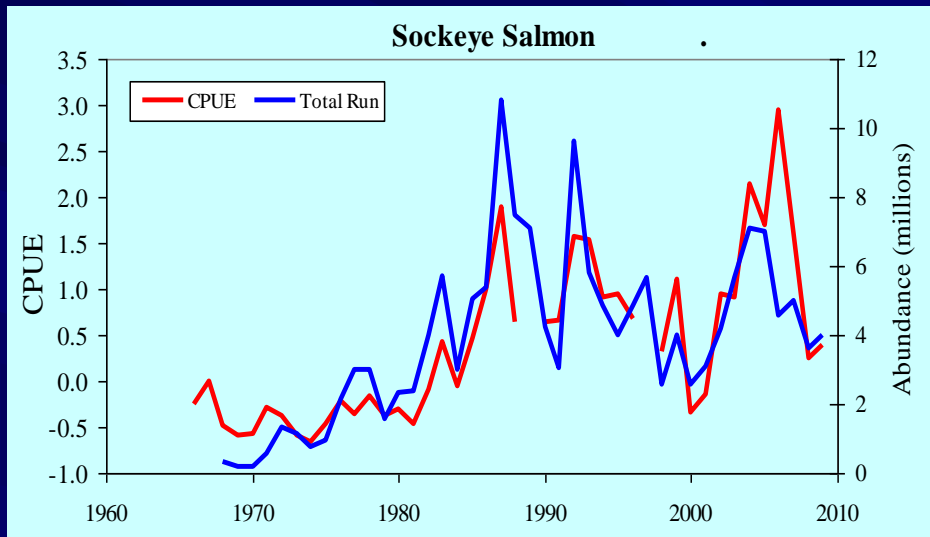
Mark-recapture estimates of coho salmon abundance in each area are indicated in boxes.

Abundances are in thousands of fish.

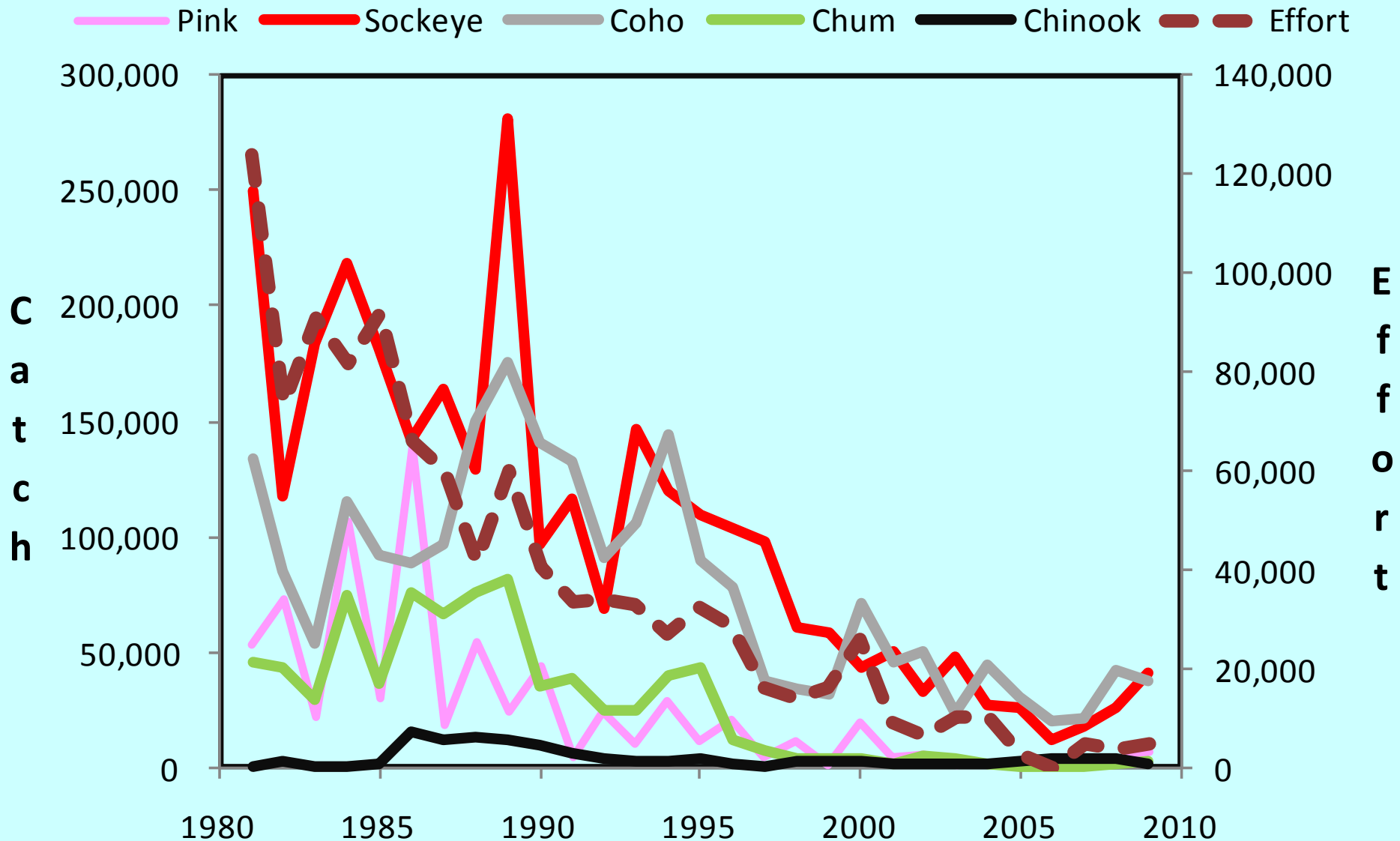


Drift Gillnet CPUE and Test Fishery Abundance Estimates

CPUE indicates deviation from average catch per effort in drift gillnet fishery.
Total run of sockeye salmon was estimated from sum of catch and escapement.
Total run of pink, coho, and chum salmon was estimated from Offshore Test Fishery.
Black dots indicate range of mark-recapture abundance estimates for coho and chum salmon.



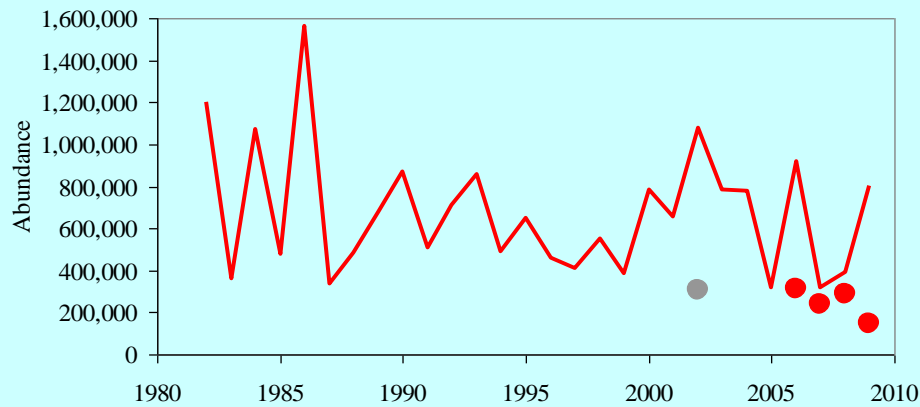
Northern Cook Inlet Salmon Catch



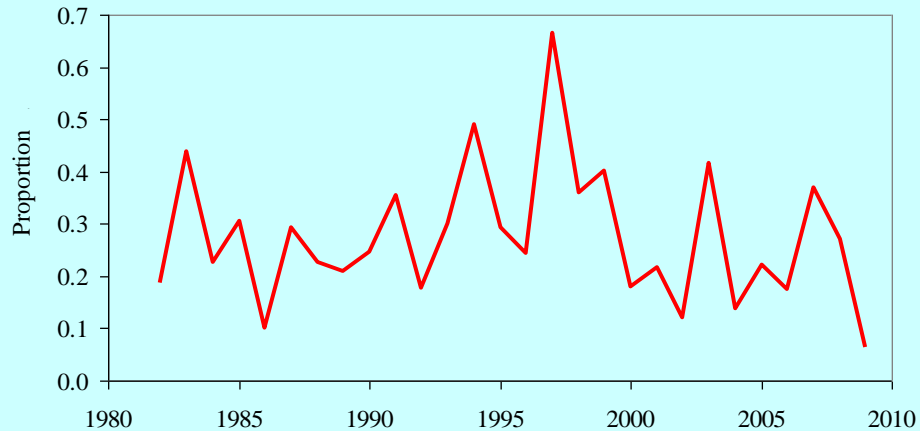
Yentna River Salmon Abundance

Total salmon abundance is estimated using sonar. Proportions of each species in fish wheel catches are indicated for comparison. Dots indicate mark-recapture abundance estimates for coho (gray) and sockeye (red) salmon.

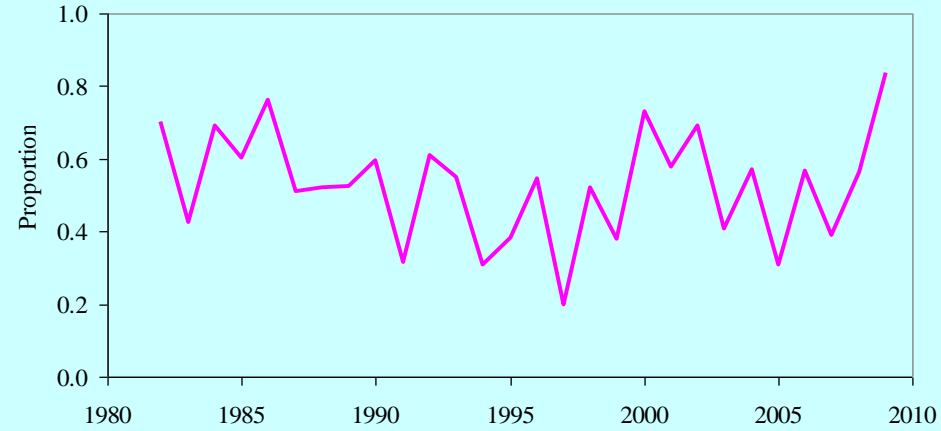
Total Salmon



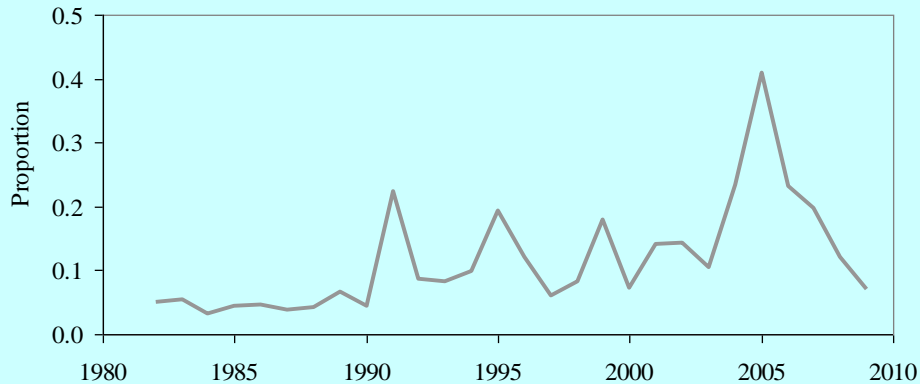
Sockeye Salmon



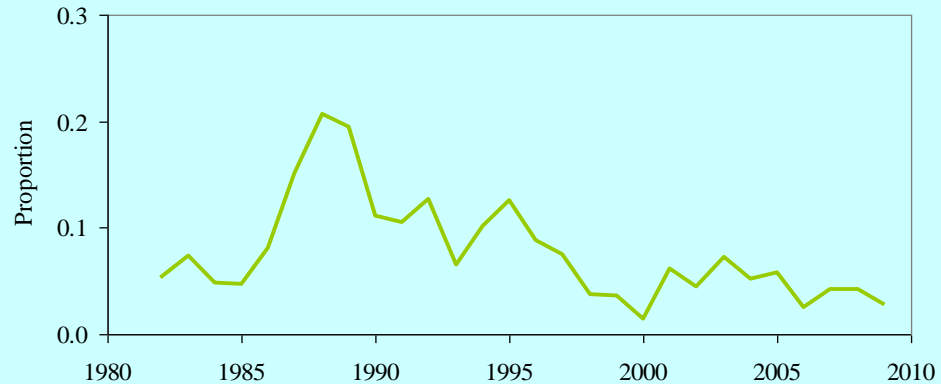
Pink Salmon



Coho Salmon

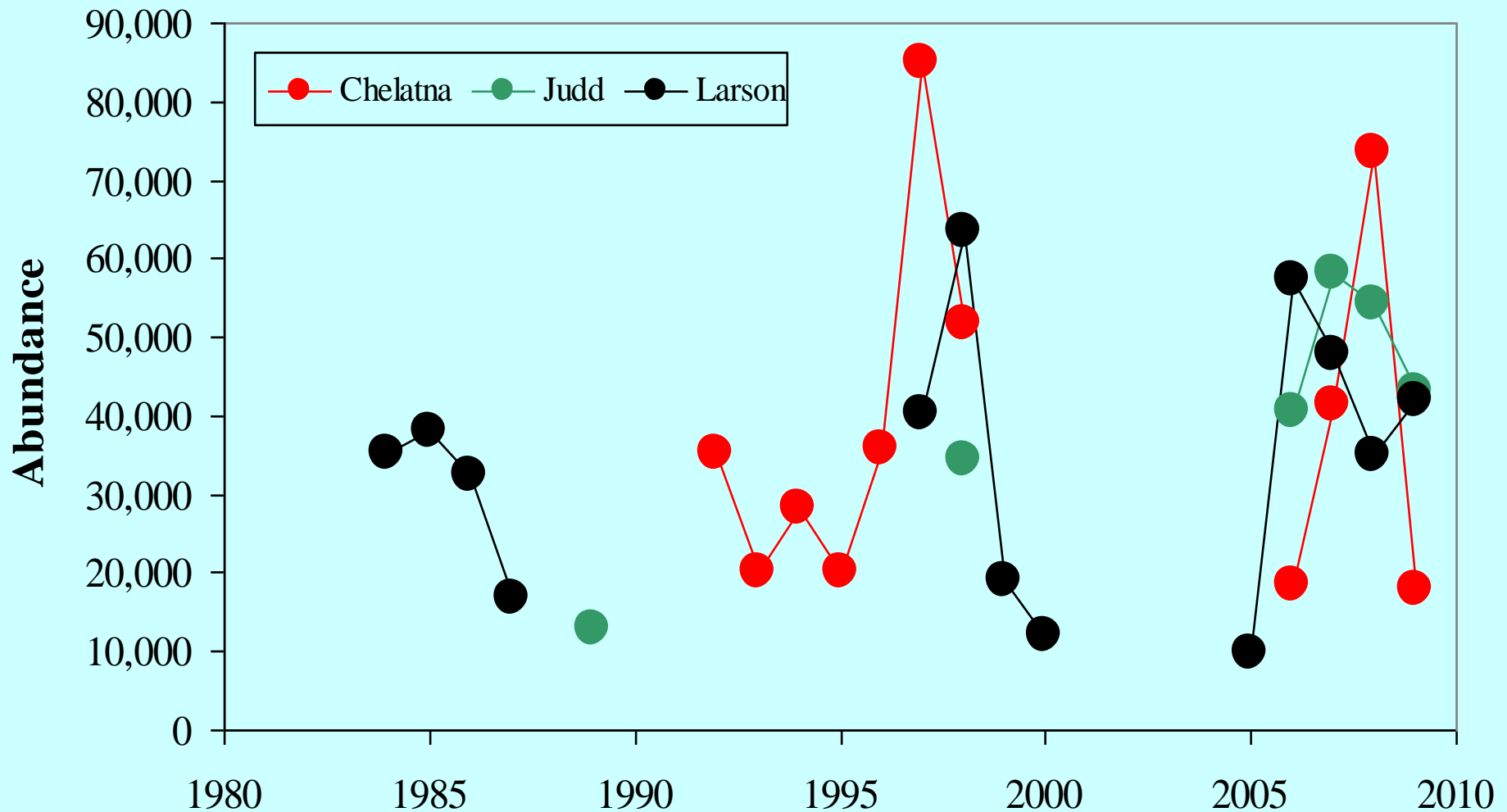


Chum Salmon



Susitna Sockeye Salmon Abundances

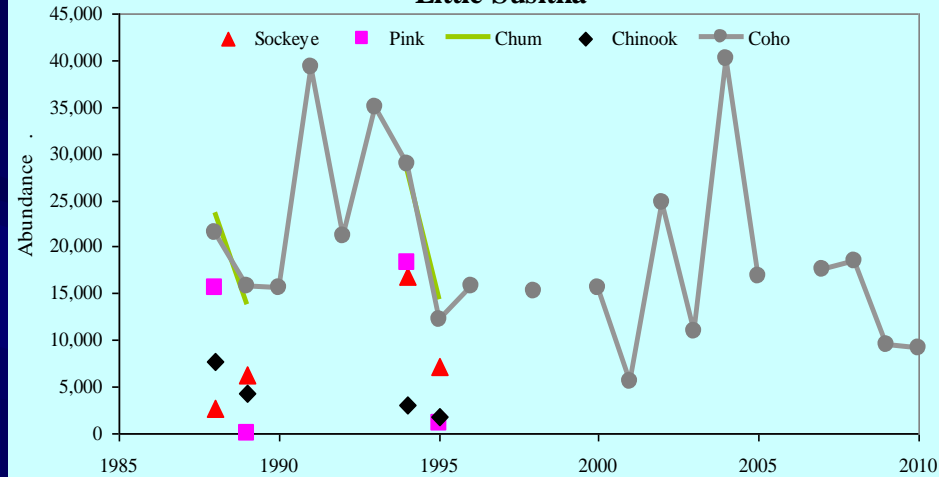
(Estimated using weirs on three major lake systems in the watershed)



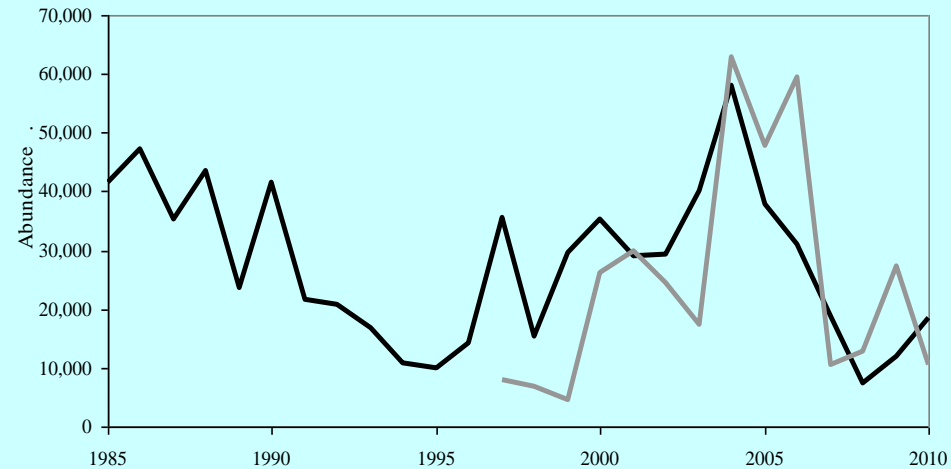
Other Northern Cook Inlet Salmon Abundances

(Estimated using weirs on Little Susitna, Deshka, and Fish Creek, and ground surveys on Jim Creek)

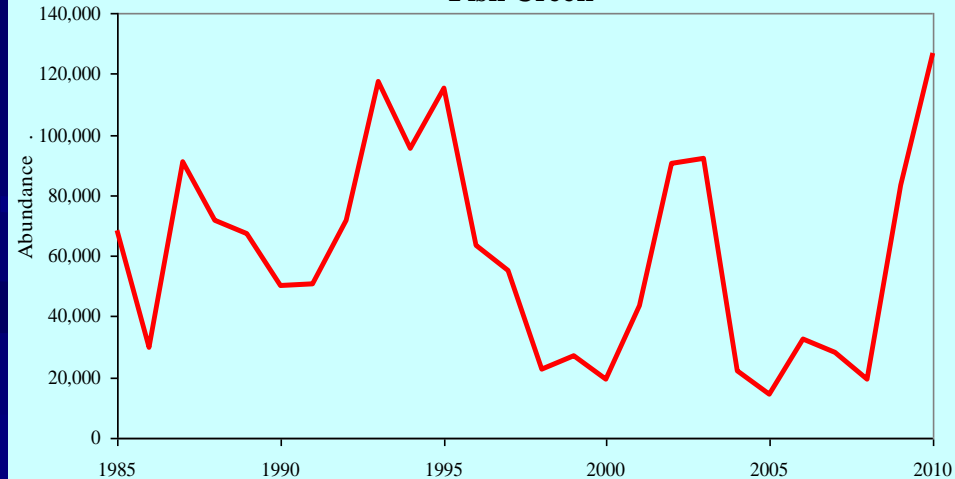
Little Susitna



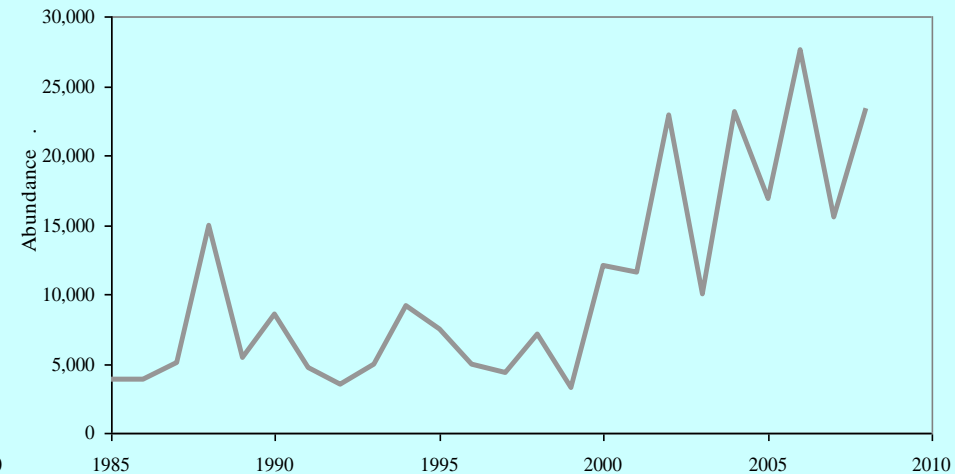
Deshka River



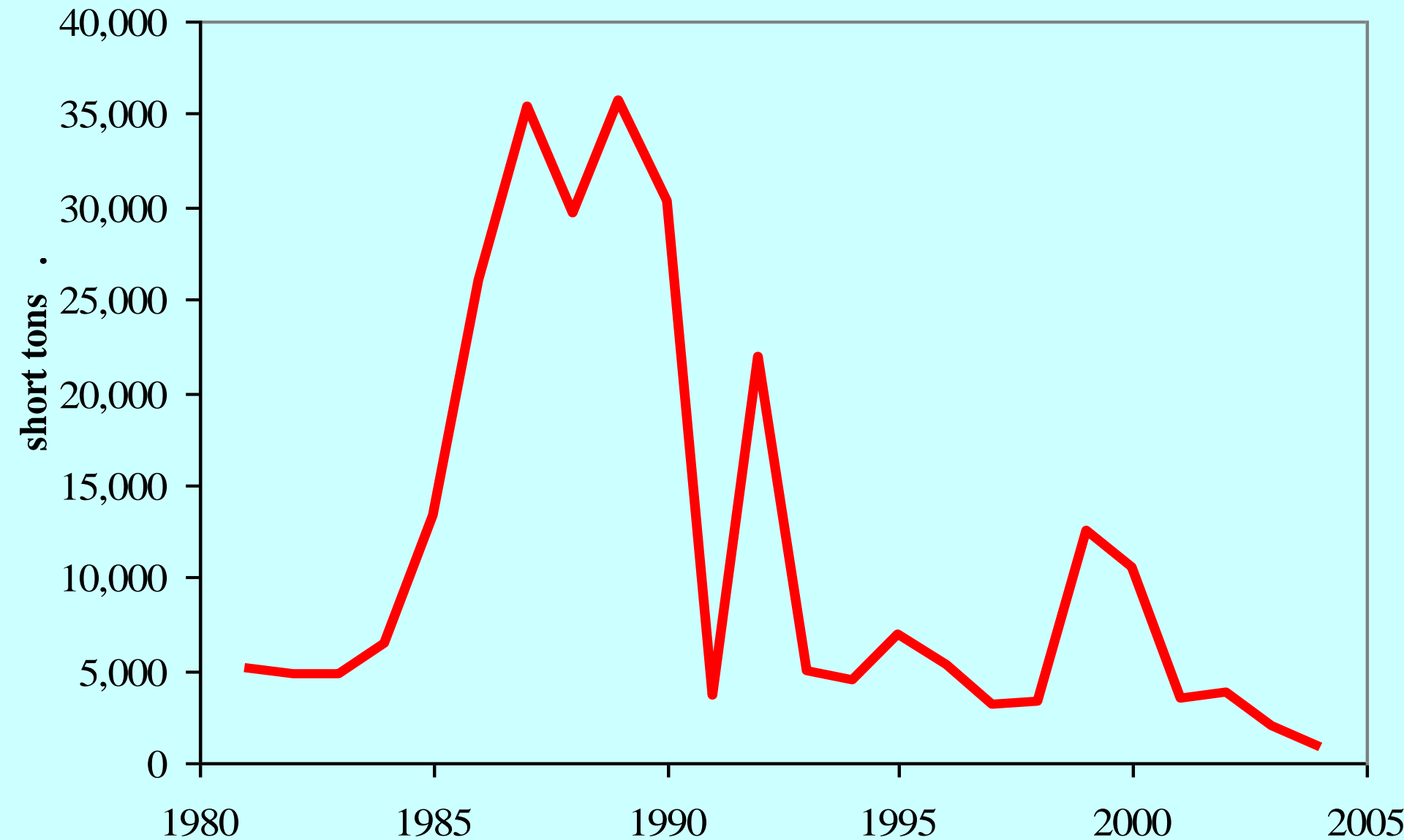
Fish Creek



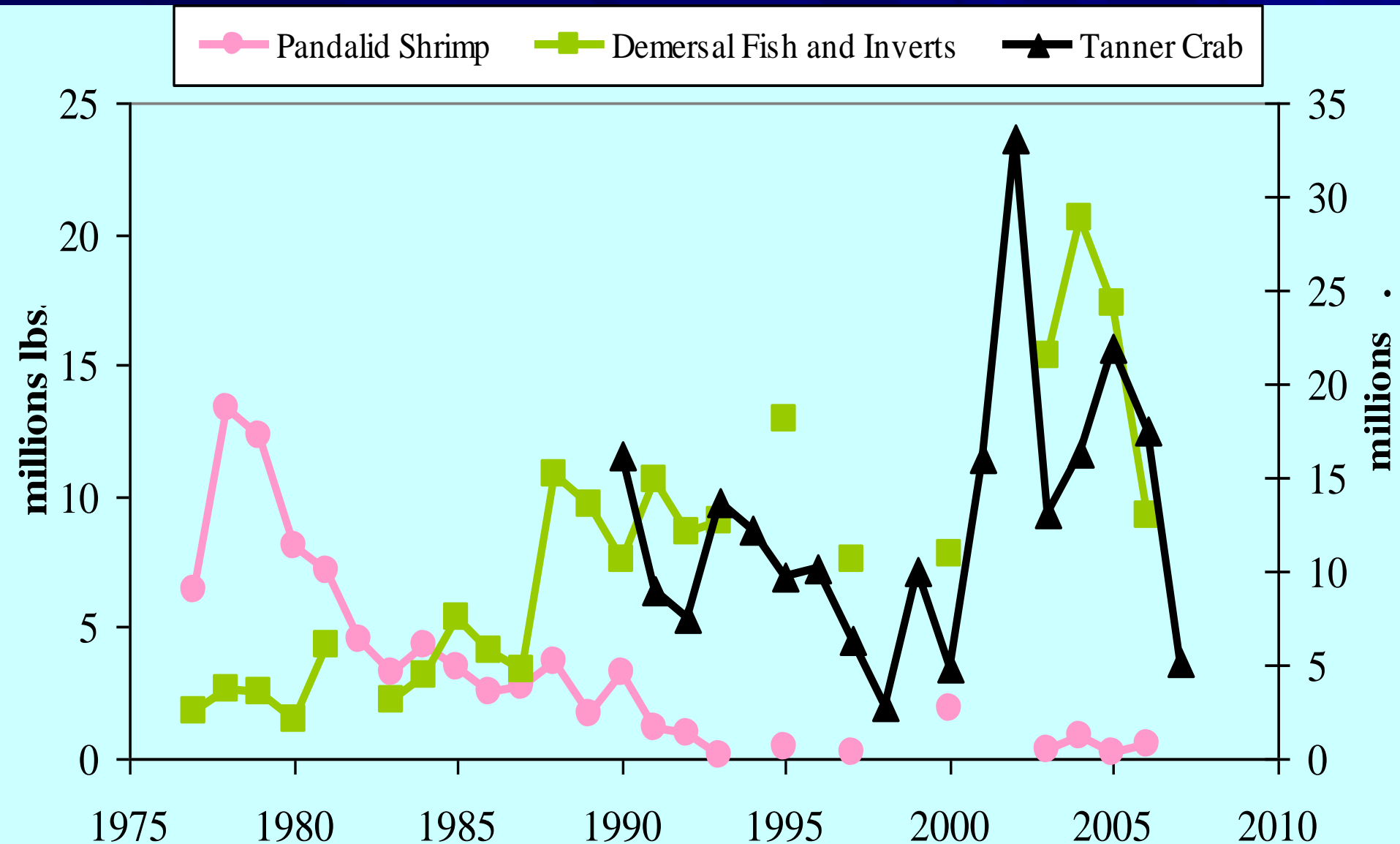
Jim Creek



Pacific Herring Biomass in Kamishak Bay



Pandalid Shrimp, Tanner Crab, and Demersal Fish Abundances in Lower Cook Inlet



Summary

- Strong tidal currents running up the deep channel in the center of the inlet cause formation of tide rips and subsequent downwelling
- Coarse bottom sediments are found in areas with strongest currents likely affecting fish and invertebrate species assemblages
- A turbid, freshwater surface layer flows out along the west side, while clearer, high salinity water flows in along the east side
- Northern Cook inlet food webs are likely detritus based due to high turbidity
- Gyres west of Kachemak Bay cause nutrient upwelling and increased biological production

Summary

- Eulachon biomass in the central Gulf of Alaska has increased and the Susitna eulachon run generally peaks in late May
- West side rivers support small Chinook and moderate coho salmon runs
- Susitna River supports relatively large runs of all five salmon species
- Little Susitna River supports moderately sized runs of pink, chum, and coho salmon
- Knik and Turnagin Arm rivers support relatively small runs of all five salmon species
- Coho salmon were most abundant in Susitna River and 3X more abundant in Knik Arm than Turnagin Arm in 2002

Summary

- Sockeye and coho salmon abundances have generally increased in upper Cook Inlet while chum salmon abundances have decreased
- Salmon catches in northern Cook Inlet have generally declined due largely to declining fishing effort
- Kamishak herring biomass has declined from 35,000 tons in the late 1980's to less than 5,000 tons
- Pandalid shrimp abundances have declined and demersal fishes (mostly pollock) have increased since the 1980's in lower Cook Inlet
- Decadal changes in fish abundance are related to North Pacific climate shifts affecting ocean temperature, zooplankton biomass, and spring plankton bloom timing

